



Authorizations and Permits for Protected Species (APPS)

File #: 20339

Title: Application for a scientific research and enh

Modification: 2

Applicant Information

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Project Information

File Number: 20339

Application Status: **Application Complete**

Project Title: Application for a scientific research and enhancement permit under the ESA; development and testing of gear aboard commercial fishing vessels.

Project Status: Renewal

Previous Federal or State [16253](#)

Permit/Authorization:

Permit/Authorization Requested:

- ESA Section 10(a)(1)(A) permit (other) - Issued

Where will activities occur? US Locations including offshore waters
International waters
Foreign Countries including territorial waters

Research Timeframe: **Start:** 05/23/2017 **End:** 05/31/2022

Sampling Season/Project Duration:	The sampling will be conducted year round for a 5-year period. Under Project A, we have been conducting approximately 80 days of dependent contract commercial trawl work per year and 60 days of independent trawl work. Under Project B, we have not regularly conducted work on an annual basis in recent years, but Longline Alternative Gear research projects requiring approximately 30 days of independent research are planned for the near future under early restoration projects. For each of these projects effort can vary depending on funding availability and management needs. Variation from current levels can fluctuate as much as 75%.
Abstract:	The purpose of the research is to evaluate modifications to commercial fishing gear to mitigate sea turtle interactions and capture under two projects, Project A (Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries) and Project B (Evaluation of Longline Alternative Gear). These evaluations and subsequent gear modifications could help to reduce incidental turtle bycatch in the gear types studied. The research would also provide new data to improve stock assessments, assess the impact of anthropogenic activities, better manage, and recover these species. Under Project A, we request the following annual take numbers: 220 (70 of these to include capture) loggerheads (<i>Caretta caretta</i>), 105 (25 of these captures) Kemp's ridleys (<i>Lepidochelys kempii</i>), 85 (20 of these captures) leatherbacks (<i>Dermochelys coriacea</i>), 50 (15 of these captures) greens (<i>Chelonia mydas</i>), 30 (10 of these captures) hawksbills (<i>Eretmochelys imbricata</i>), 30 (10 of these captures) olive ridleys (<i>Lepidochelys olivacea</i>), and 75 (25 of these captures) unidentified/hybrid turtles. A subset of these animals will be captured during trawl research authorized under this permit as noted in the parentheses; the rest of the turtles will be captured within fisheries managed by Federal authority. Under Project B, we request the following annual take numbers: 30 loggerheads, 10 Kemp's ridleys, 30 leatherbacks, 10 greens, 10 hawksbills, 10 olive ridleys, and 10 unidentified/hybrid turtles. Animals will be handled, measured, weighed, photographed, flipper tagged, passive integrated transponder tagged, skin biopsied, and released. The research will be conducted for five years in waters of the Atlantic Ocean, Gulf of Mexico, Caribbean Sea and their tributaries; there is also the potential to work in offshore waters, and international waters.

Project Description

Purpose: The purpose of our research projects is to mitigate fishery bycatch on sea turtle populations, and to collect basic biological information during documented interactions at various life stages to help in the recovery process of these species. The information will be used to develop, implement, enhance and evaluate conservation recovery efforts for sea turtles in the Gulf of Mexico, Atlantic Ocean, Caribbean Sea, and their tributaries. This research builds upon years of data collected by SEFSC researchers under NMFS#1260, #1570 and #16253. Tag recapture data provide point-to-point information on movement patterns (NMFS and USFWS 2008). Even the most basic biological sampling (identification, measurements, and tagging) conducted by our researchers helps to contribute to the knowledge base of in-water seasonal and size class distribution patterns, as well as identifying the life history stages and DPS or nesting populations most vulnerable to fishery bycatch and mortality through morphometric and genetic analyses.

Our work addresses the following Kemp's ridley turtle recovery plan (NMFS and USFWS 2011) Recovery Objectives: (223) Monitor fisheries and reduce interactions; specifically addressing (2234) Reduce mortality in all fisheries of concern; and (22342) Require TEDs or other equally effective bycatch reduction measures as appropriate in all trawl fisheries of concern; (22344) Reduce mortality in hook and line fisheries; and secondarily addresses (2292) Genetic composition on foraging grounds.

This work would address priorities identified in the loggerhead species recovery plan (NMFS and USFWS 2008) by providing context for measuring proportional stock impacts of fisheries, mark-recapture tagging studies, survivorship, stable isotope analysis and growth data address in-water data gaps for monitoring population status: (1) Determine demographic parameters, refine population genetic structure, and monitor distribution, abundance, and trends. The primary objective of our work addresses or supports the following loggerhead Recovery Action items: (62) Minimize loggerhead bycatch in domestic fisheries using a gear-based strategy; specifically (622) Minimize loggerhead bycatch in domestic shrimp trawl fisheries; (6221) Describe and characterize domestic commercial and recreational shrimp trawl fisheries; (6225) Continue efforts to educate domestic and commercial shrimp fishers on the proper installation and use of larger-opening TEDs; investigate turtle exclusion rates for soft TEDs under field conditions using videography; (623) Minimize loggerhead bycatch in domestic commercial

non-shrimp trawl fisheries; (6234) Implement seasonal large-opening TED regulations for domestic commercial non-shrimp trawl fisheries operating from Cape Hatteras, North Carolina, north to Cape Cod, Massachusetts; (6235) Promulgate regulations to require TEDs in domestic commercial flynet trawl fisheries; (6236) Promulgate regulations to require large-opening TEDs in all domestic commercial non-shrimp trawl fisheries south of Cape Hatteras, North Carolina; (624) Minimize loggerhead bycatch in domestic commercial pelagic and demersal longline fisheries; (6244) Continue to conduct focused experiments on domestic commercial longline gear and fishing practices to minimize loggerhead interactions and secondarily to minimize post-interaction mortality; (6248) Promote the use of safe handling practices and careful release tools in domestic commercial pelagic and demersal longline fisheries; (627) Minimize loggerhead bycatch in other domestic commercial fisheries; (63) Minimize loggerhead bycatch in foreign commercial fisheries; (631) Disseminate results of bycatch reduction experiments and transfer demonstrated bycatch reduction technologies to foreign nations; (634) Encourage and assist foreign nations to develop, implement, and enforce fishery regulations to minimize loggerhead bycatch in commercial trawl fisheries; (636) Encourage and assist foreign nations to develop, implement, and enforce fishery regulations to minimize loggerhead bycatch in other commercial fisheries.

Our work addresses or supports the following leatherback recovery plan (NMFS and USFWS 1992) Recovery Objectives: (222) Monitor and reduce mortality from commercial and recreational fisheries; (2221) Implement measures to reduce capture and mortality from commercial shrimping vessels; (2223) Promulgate and enforce appropriate regulations to reduce hook and line, drift net, gill netting and other fisheries related mortality.

Our work addresses or supports the following green turtle recovery plan (NMFS and USFWS 1991) Recovery Objectives: (222) Monitor and reduce mortality from commercial and recreational fisheries; (2221) Implement and enforce TED regulations in all US waters at all times; (2222) Provide technology transfer for installation and use of TEDs; (2224) Identify and monitor other fisheries that may be causing significant mortality; (2225) Promulgate regulations to reduce fishery related mortalities.

Our work addresses or supports the following hawksbill recovery plan (NMFS and USFWS 1993) Recovery Objectives: (222) Monitor and reduce incidental mortality in the commercial and recreational fisheries.

Our work addresses or supports the following olive ridley recovery plan (NMFS and USFWS 1998) Recovery Objectives: (1.1.5.3.2) Determine nesting beach origins for juvenile and subadult populations; (2.1.4) monitor and reduce incidental mortality in the commercial and recreational fisheries.

Background

In 1978, the NMFS, SEFSC initiated an intensive gear research program resulting in the development of the TED. In 1987, regulations were enacted requiring the use of TEDs in shrimp trawls operating in the southeastern U.S. shrimp fishery. Since then NMFS observers have documented sea turtle takes in many other trawl fisheries. In 2003, NMFS initiated the Strategy for Sea Turtle Conservation in relation to Atlantic and Gulf of Mexico Fisheries (Strategy). The Strategy is a program devoted to reducing sea turtle bycatch by evaluating and addressing priority gear types on a comprehensive per-gear basis throughout the Atlantic and Gulf of Mexico, rather than fishery by fishery. Trawl gear was determined to be the highest priority under this program because it posed the greatest fishery threat to sea turtles. Murray (2006, 2007, and 2015) estimated loggerhead bycatch in various fisheries in the mid-Atlantic and Northeast regions of the US and identified the Atlantic croaker flynet fishery as a fishery of concern with regard to sea turtle bycatch. In 1998, the NMFS SEFSC initiated research to develop TEDs designed for use in the flynet fishery. Several prototypes have been developed and continue to be tested with regulations requiring the gear forthcoming (Gearhart 2010).

The skimmer trawl and butterfly net or wing net fisheries have also been identified as fisheries of concern. These gear types are currently exempt from TED requirements. Vessel operators must adhere to tow times when using these types of nets. However, Scott-Denton et al (2007) found that tow times were often exceeded and averaged 102 min during the 2004-2005 study. This determination combined with a large number of localized strandings attributed to the skimmer trawl fishery in Mississippi during the 2010

shrimp season have prompted managers to consider TED requirements for all skimmer trawls in the near future. Preliminary testing has been conducted with positive results, but work is needed before TEDs are implemented into these fisheries.

Another fishery of concern is the crab trawl fishery, which primarily operates in nearshore and inshore waters of North Carolina. Although TEDs are not required, this fishery occurs at times and in areas where sea turtles occur. The NMFS is preparing to investigate the feasibility and performance of TED use in this fishery of the next few years.

In 2001, NMFS in cooperation with the commercial pelagic longline fisheries initiated research in the Atlantic Ocean to investigate the effectiveness of potential mitigation measures to reduce sea turtle interactions with pelagic longline gear (Watson et al. 2002, 2003, 2004, 2005). The University of Florida (Archie Carr Center for Sea Turtle Research) and the University of the Azores conducted experiments in 2001 to evaluate effects of hook type on sea turtle bycatch in the swordfish fishery in the Azores (Bolten et al. 2002). They found that 16/0 circle hooks reduced the rate of deep ingestion by loggerhead turtles compared to traditional "J" hooks. Watson et al. (2005) found that 18/0 circle hooks with 10° or less offset used with squid or mackerel bait significantly reduced both loggerhead and leatherback interactions, and when used with mackerel bait, 18/0 circle hooks did not impact swordfish catch rates when compared to "J" hooks and squid bait. As a result of this research, regulations were promulgated in 2004 to implement sea turtle mitigation measures into the U.S. pelagic longline fisheries. Additionally, NMFS and its research partners developed gear and techniques to safely remove longline gear from turtles and other bycatch species that interact with longline gear, significantly increasing the survival odds of impacted animals.

As a result of this research with pelagic longline gear, regulations were promulgated in 2004 to implement sea turtle mitigation measures into the U.S. pelagic longline fisheries. The October, 2003 Endangered Species Act Section 7 Consultation Biological Opinion on the continued operation of Atlantic shark fisheries recommended that sea turtle mitigation techniques found to be successful at reducing sea turtle interactions rates with pelagic longline gear in the western Atlantic Northeast distant waters experiments should be evaluated for their potential use and effectiveness in reducing sea turtle interaction rates in bottom longline fisheries. Also, NMFS, in cooperation with federal and non-federal researchers, should conduct additional studies to develop and evaluate fishing gear modifications and tactics (e.g., visual or acoustic cues, dyed bait, hook type) to reduce the likelihood of interactions between fishing gear and sea turtles, and to reduce immediate and delayed mortality rates of sea turtles captured in bottom longline fisheries. RPMs in the Opinion also require NMFS F/SF1 to implement or fund outreach programs for shark fishers aimed at reducing the potential for serious injury or mortality of hooked sea turtles and smalltooth sawfish. NMFS F/SF1 must implement a series of workshops or other training programs that at a minimum provide information regarding gear handling techniques and protocols that deal with entanglements and protected species.

Over the next few years, NMFS plans to continue conducting outreach and training with the commercial longline fishery on gear handling and removal techniques for protected species including sea turtles. In addition, NMFS plans to examine turtle-safe alternatives to longline fishing techniques such as "Green-stick" and "Buoy-gear."

Project A: Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries

The objective of the proposed research is to develop TEDs for trawl gear types used along the Atlantic coast and the Gulf of Mexico of the U.S. that are either not subject to the TED requirement or are required to use TEDs but may need additional studies directed at improving TED efficiency for turtle exclusion or target catch retention. These fisheries operate within the migratory path of leatherbacks, loggerheads, greens, and Kemp's ridley sea turtles during seasons when turtles are likely to be present. This research will occur by 1) studying animals within commercial fisheries where the capture of the animals is already authorized by an ESA Section 7 biological opinion and 2) independent surveys operated by researchers or contracted vessels operating in state waters where capture and subsequent sampling of turtles would be authorized to test various experimental gear modifications.

The proposed research, regardless of trawl gear type, will assess the effect of TED installation on the Catch Per Unit Effort (CPUE, pounds of catch/100' of head rope/hours

towed) of target catch. This will be conducted through paired comparisons aboard commercial vessels utilizing either twin trawls or alternate-haul experimental designs where an unmodified net will serve as a control and an identical net with a TED installed will serve as the experimental net. The null hypotheses of these studies is that there is no difference in target catch between control and experimental nets, while the alternate hypotheses will be that the catches of the control and experimental net are significantly different at the 0.05 alpha level. In some cases, two TED configurations may be compared utilizing the same experimental designs and hypotheses with one TED configuration designated as a control. Prior to and after quantitative testing, qualitative assessments of TED configurations will also be conducted utilizing net mounted cameras to examine TED components and associated target and bycatch species behavior. These assessments will inform conservation engineers about functionality and performance of design aspects of TED components. If turtles are observed in the trawl during this portion of the research, turtles are allowed 5 minutes to escape through the TED opening. If the turtle does not escape in this time frame or the turtle is not visible on the camera, the tow will be terminated and trawl retrieved.

Although all trawl fisheries may be evaluated, research will focus on the following: Mid-Atlantic Region
Flynet Fishery & High Opening Bottom Trawl

The flynet fishery is a multispecies fishery composed of offshore and nearshore elements that operate along the East Coast of the U.S. The nearshore fishery operates from October through April within 60 meters of the coast from North Carolina to New Jersey and targets Atlantic croaker (*Micropogonias undulatus*), weakfish (*Cynoscion regalis*), butterfish (*Peprilus triacanthus*), harvestfish (*Peprilus alepidotus*), bluefish (*Pomatomus saltatrix*), Atlantic menhaden (*Brevoortia tyrannus*), striped bass (*Morone saxatilis*), and kingfishes (*Menticirrhus* spp). The offshore fishery operates from November through April outside 60 meters from the Hudson Canyon off New York, south to Hatteras Canyon off North Carolina. Target species for the offshore fishery include bluefish (*Pomatomus saltatrix*), Atlantic mackerel (*Scomber scombrus*), squid (*Loligo* and *Illex* spp.), black sea bass (*Centropristis striata*), and scup (*Stenotomus chrysops*); squid are also targeted offshore (130-365 meters) during summer months from May through September.

Research and development of a suitable TED design for the flynet fishery began in 1998 with the first commercial field trials conducted in 2000. Development of a TED for the nearshore flynet fishery has been ongoing since 2001 under the ESA permits #1260, #1570, and 16253. A flexible "cable TED" has been developed and is currently being tested for target fish retention. Based on the success of the work to date, implementation of a TED requirement for this fishery is likely. However, additional testing needs to be conducted to test the feasibility of new designs or design modifications. Proposed research under this permit would test TED prototype designs aboard vessels fishing in nearshore areas. Additional TED feasibility research may include those fisheries employing other high opening bottom trawl designs which target scup, black sea bass, and inshore aggregations of *Loligo* squid.

The fishery is a multispecies fishery composed of offshore and nearshore components that operate along the East Coast of the U.S. The nearshore fishery operates from October through April inside of 30 fms from North Carolina to New Jersey and targets Atlantic croaker (*Micropogonias undulatus*), weakfish (*Cynoscion regalis*), butterfish (*Peprilus triacanthus*), harvestfish (*Peprilus lepidotus*), bluefish (*Pomatomus saltatrix*), menhaden (*Brevoortia tyrannus*), striped bass (*Morone saxatilis*), and kingfishes (*Menticirrhus* spp). The nearshore component, targeting Atlantic croaker, has been the primary focus of TED development due to sea turtle takes observed by the Northeast Fisheries Observer Program (NEFOP). Vessels that operate in this fishery tow a single trawl, which limits gear testing to either trawl or alternate-haul experimental designs.

One TED design has been certified for use in this fishery and another is currently being tested. Testing during the permit cycle will include up to 30 tows of a single TED design per year. This work may occur from October through April inside of 30 fms from North Carolina to New Jersey along the Atlantic Coast. Most recent testing resulted in 11 loggerhead takes during 15 tows for a take rate of 0.73 turtles per tow, which is what we used to estimate our requested take levels.

Crab Trawl Fishery

The crab trawl fishery primarily operates in inshore waters of North Carolina from October through November and March through June. The fishery is not subject to TED

requirements. Work under this project may investigate the feasibility of TED use in these gear types. Qualitative and quantitative assessments may be conducted aboard commercial vessels to assess the effect of TEDs on the Catch Per Unit Effort (CPUE) of crabs.

No previous TED testing or observer work has been conducted in this fishery; therefore previous take levels are unknown. The fishery operates exclusively in the internal waters of North Carolina and is currently exempt from TED regulations. Vessels operate during fall months from October through December, which make it a high priority fishery for TED development. However, effort is highly variable inter-annually and depends on availability of target catch. This makes research planning difficult and requires testing to be done opportunistically based on fishery effort. If testing does occur during the permitting cycle, up to two devices would be evaluated during a season with a minimum of 30 comparative tows completed with each device. Additional tows would likely be conducted for qualitative gear assessments. Because gears are similar, we used shrimp trawl fishery take rates as proxies for this fishery when calculating our requested take level estimates.

Shrimp Trawl Fishery

The Atlantic shrimp trawl fishery primarily operates in nearshore waters from North Carolina to Florida from April through December. While the shrimp otter trawl fishery in the Atlantic is subject to TED requirements, future work under this project may require evaluations of modifications to TEDs which may improve turtle exclusion and or shrimp retention. Such research may require comparison tows between modified and unmodified TEDs to assess differences in shrimp CPUE. Assessments of TEDs which have been modified to improve sea turtle exclusion may require qualitative work using cameras installed in and around the TED to observe turtle exclusion efficiency.

The shrimp trawl fishery in the South Atlantic operates in the inshore, nearshore, and offshore waters of North Carolina, South Carolina, Georgia, and Florida from April through December and is subject to TED requirements. Work planned in the South Atlantic for the duration of this permit will be comprised of two exclusive components; commercial catch retention TED testing and wild turtle TED testing. Catch retention testing will be conducted aboard contracted commercial vessels and with control and experimental trawls employed in a matched-pairs experimental design. Up to two devices will be evaluated each season during commercial catch retention TED testing with a minimum of 30 comparative tows completed with each device. Additional tows would likely be conducted for qualitative gear assessments. Wild turtle TED testing will examine the exclusion efficiency of TEDs equipped with standard and experimental TEDs on wild sea turtles. The evaluations will be conducted in the nearshore Atlantic waters of south Georgia and north Florida, known to have a seasonally high abundance of loggerhead (*Caretta caretta*) sea turtles. The evaluations will be conducted with surface-wired, underwater video cameras attached to TEDs in order to obtain real time images of turtles interacting with the gear. Video recordings obtained will be utilized to examine TED components and associated target and bycatch species behavior. These assessments will inform conservation engineers about functionality and performance of design aspects of TED components. If turtles are observed in the trawl during this portion of the research, turtles are allowed 5 minutes to escape through the TED opening. If the turtle does not escape in the time allowed or the turtle is not visible on the camera, the tow will be terminated and trawl retrieved.

Because there was no otter trawl catch retention testing conducted during the previous permit cycle in the South Atlantic, Gulf of Mexico sea turtle catch rates were used as a proxy to estimate expected takes. Wild turtle TED testing catch rates during the previous permit cycle were 0.084 loggerheads per tow and 0.01 Kemp's ridleys per tow.

Skimmer trawls

Skimmer trawl, butterfly and wing net fisheries operate from March through December in the inshore waters of North Carolina and Florida. Skimmer trawls are not currently subject to the TED requirement. However, TED feasibility and evaluation research has been ongoing since 2008 with TED requirements expected to be implemented in the near future. Work under this project may investigate the feasibility of TED use in these gear types. Qualitative and quantitative assessments may be conducted aboard commercial vessels to assess the effect of TEDs on the CPUE of shrimp. Work planned in these fisheries for the duration of this permit will be comprised of commercial catch retention TED testing. Up to three devices will be evaluated each season during commercial catch retention testing with a minimum of 30 comparative tows completed with each device.

Additional tows would likely be conducted for qualitative gear assessments.

Sea turtle catch rate for South Atlantic skimmer trawl catch retention TED testing during the previous permit cycle was 0.009 Kemp's ridleys per tow. Because no loggerhead sea turtles were encountered during the previous permit cycle, Gulf of Mexico skimmer trawl loggerhead catch rates may be used as a proxy to estimate expected takes.

Gulf of Mexico Shrimp Trawl Fishery

The shrimp trawl fishery in the Gulf of Mexico operates in the inshore, nearshore, and offshore waters of Florida, Alabama, Mississippi, Louisiana, and Texas year round and is subject to TED requirements. The shrimp otter trawl fishery in the Gulf of Mexico is subject to TED requirements, future work under this project may require evaluations of modifications to TEDs which may improve turtle exclusion and or shrimp retention. Such research may require comparison tows between modified and unmodified TEDs to assess differences in shrimp CPUE. Assessments of TEDs which have been modified to improve sea turtle exclusion may require qualitative work using cameras installed in and around the TED to observe turtle exclusion efficiency.

Work planned in the Gulf of Mexico for the duration of this permit will be comprised of commercial catch retention TED testing and small turtle TED testing. Up to two devices will be evaluated each season during commercial catch retention testing with a minimum of 30 comparative tows completed with each device. Additional tows would likely be conducted for qualitative gear assessments. Small turtle TED testing will be conducted with captive reared loggerhead sea turtles with NOAA divers riding trawls during evaluations. Up to 50 tows will be conducted each year following the small turtle testing protocol, which requires 25 captive reared turtle exposures for each device. Escape rates for candidate TED configurations are compared to escape rates of a control TED to determine if candidate TEDs are allowable for commercial use. Captive reared turtles are allowed a 5 minute time limit to escape the trawl. If the turtle does not escape in this time frame, a diver removes the turtle from the trawl. Wild turtles that are observed in the trawl are monitored by divers until they escape. If a wild turtle appears stressed or has difficulty escaping, divers will signal the trawl vessel to reduce speed and divers will assist turtle escapement.

Sea turtle catch rates for Gulf of Mexico catch retention TED testing during the previous permit cycle were 0.0318 loggerheads per tow and 0.0396 Kemp's ridleys per tow. Small turtle testing catch rates during the previous permit cycle were 0.023 loggerheads per tow and 0.057 Kemp's ridleys per tow.

Skimmer trawls, Butterfly, and Wing Nets

The Gulf of Mexico skimmer trawl, butterfly and wing net fisheries primarily operates in inshore and nearshore waters of Florida, Alabama, Mississippi, and Louisiana from March through December. Skimmer trawls, butterfly, and wing nets are not currently subject to TED requirements. However, skimmer trawl TED feasibility and evaluation research has been ongoing since 2008 with TED requirement expected to be implemented for skimmer trawls in the near future. Work under this project may investigate the feasibility of TED use in butterfly and wing nets. Qualitative and quantitative assessments may be conducted aboard commercial vessels to assess the effect of TEDs on the CPUE of shrimp. Work planned in these fisheries for the duration of this permit will be comprised of commercial catch retention TED testing and diver evaluations. Up to three devices will be evaluated each season during commercial catch retention testing with a minimum of 30 comparative tows completed with each device. Additional tows would likely be conducted for qualitative gear assessments. Diver evaluations will be conducted with NOAA divers riding trawls and filming gear configurations. These assessments will inform conservation engineers about functionality and performance of design aspects of TED components. Turtles that are observed in the trawl during this research are monitored by divers until they escape. If a turtle appears stressed or has difficulty escaping, divers will signal the trawl vessel to reduce speed and divers will assist turtle escapement. Up to 50 tows will be conducted each year for the duration of the permit cycle.

Sea turtle catch rates for Gulf of Mexico skimmer trawl catch retention TED testing during the previous permit cycle were 0.009 loggerheads per tow and 0.010 Kemp's ridleys

per tow. Skimmer trawl diver evaluation catch rates during the previous permit cycle were 0.212 Kemp's ridleys per tow. Because there were no loggerhead catches for this research during the previous permit cycle skimmer trawl catch retention catch rates were used as a proxy to estimate expected takes.

Groundfish Fishery

The Gulf of Mexico groundfish fishery is limited in effort at the present time; however, this fishery is currently exempt from TEDs. Future work under this project may require an investigation of the feasibility of TED use in this fishery. Qualitative and quantitative assessments may be conducted aboard commercial vessels to assess the effect of TEDs on the CPUE of targeted groundfish species. No previous TED testing or observer work has been conducted in this fishery, therefore take rates are unknown. The fishery operates exclusively in the inshore and nearshore waters of Louisiana and is currently exempt from TED regulations. Vessels operate from October through January, which make it a high priority fishery for TED development. However, effort is highly variable inter-annually and depends on availability of target catch. This makes research planning difficult and requires testing to be done opportunistically based on fishery effort. If testing does occur during the permitting cycle, up to two devices would be evaluated during a season with a minimum of 30 comparative tows completed with each device. Additional tows would likely be conducted for qualitative gear assessments. The GOM shrimp trawl fishery could be used as a proxy for estimating sea turtle take rates.

Project B: Evaluation of Longline Alternative Gear

Research on sea turtles under Project B will occur solely within longline commercial fisheries where the incidental capture is already authorized by an existing ESA Section 7 biological opinion. In order for these fisheries to continue to operate, it is imperative that mitigation measures be developed to reduce the impact of longline gear on endangered and threatened sea turtle species. The objective of the proposed research is to develop gear alternatives to the pelagic longline fisheries along the U.S Atlantic coast and the Gulf of Mexico that mitigate bycatch species including sea turtles . These fisheries are prosecuted within the migratory path of leatherback, loggerhead, green, and Kemp's ridley sea turtles during seasons when turtles are likely to be present. The research proposed also includes the development and evaluation of mitigation techniques including the introduction of safe handling and release equipment to safely release sea turtles and other bycatch species in all fisheries. Research will involve evaluation of gear modifications such as using "greenstick gear" as an alternative to traditional longline gear and changes in fishing tactics in pelagic and bottom longline fisheries.

Description: Project A: Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries

The scope of work for this project in both the Atlantic and Gulf of Mexico will include; installation of approved and prototype TED designs aboard commercial trawlers which may be single or double rigged; installation of underwater video cameras or sonar transducers on the trawl to observe the behavior of turtles and their ability to escape through the TED and; comparative assessments of the target catch from control (no TED) and experimental (TED equipped) trawls to determine the loss/gain associated with TED use. Cameras and or sonar gear will be used during some trips to detect the escapement of fish or invertebrates through the TED escape opening during fishing operations. A detailed description of the gear types is included in the methods sections. This research will occur by 1) studying animals within commercial fisheries where the capture of the animals is already authorized by an ESA Section 7 biological opinion and 2) independent surveys operated by researchers or contracted vessels operating in state waters where capture and subsequent sampling of turtles would be authorized to test various experimental gear modifications.

The proposed project will begin on January 1, 2017 and will be completed on December 31, 2021 Locations of Atlantic coast work for Project A will be in inshore bays and estuaries, nearshore waters (within 10 fm) and offshore waters of the Exclusive Economic Zone (EEZ) from Cape Canaveral, Florida, northward to the New York/Connecticut border. Because the work will be fishery dependent, specific areas of operation and, thus, locations of takes, will be determined by the location of target catch aggregations at the time of a given trip. Points of embarkation and disembarkation aboard commercial fishing vessels used in conducting project work will include Cape Canaveral, FL; Mayport,

FL; Brunswick, GA; Charleston, SC; Beaufort, NC; Wanchese, NC; Chincoteague, VA; Newport News, VA; Barnegat Light, NJ; Cape May, NJ; Shinnecock, NY; Point Judith, RI and Gloucester, MA.

For Gulf of Mexico fisheries, project operations may be conducted in inshore bays and estuaries, nearshore waters (within 10 fm) and offshore waters outside 10 fm) from Key West, Florida to Brownsville, Texas. Points of embarkation and disembarkation aboard commercial fishing vessels in the Gulf of Mexico include Key West, FL; Fort Meyers, FL; Tampa, FL; Bon Secour, AL; Bayou La Batre, AL; Pascagoula, MS; Biloxi, MS; Grand Isle, LA; Morgan City, LA; Cameron, LA; Galveston, TX; Freeport, TX; Palacios, TX; Aransas Pass, TX; Brownsville, TX.

In fisheries managed under federal authority, researchers will fish gear within fishery guidelines, and all captures of sea turtles occurring in the fishery will be authorized by the ITS of the biological opinion of that fishery. In some cases the provision (50 CFR § 223.207) for use of experimental TEDs in shrimp trawl gear will be applied. In state waters, researchers conducting independent gear evaluations or contracting commercial fishing vessels will conduct experimental trawling on these vessels, and the capture of the turtles via trawling is requested under the authority of this permit. Requested take numbers include observed captures in control trawls, those turtles that are captured in the experimental trawls with TEDs, as well as turtles that will pass through the experimental trawls with TEDs but are not be captured (researchers may record the uncaptured turtles by video or sonar as they pass through the net).

Requested Take Levels

We expect to handle and sample juvenile, subadults, and adults of both sexes captured under the authority of federal fisheries not to exceed: 150 loggerheads, 80 Kemp's ridleys, 65 leatherbacks, 35 greens, 20 hawksbills, 20 olive ridleys, and 50 unidentified/hybrid turtles. We expect to capture in state waters sub adults & adults of both sexes not expected to exceed: 70 loggerheads, 25 Kemp's ridleys, 20 leatherback, 15 greens, 10 hawksbill, 10 olive ridley and 25 unidentified/hybrid sea turtles. Lethal takes are not expected to occur; however, in the rare event that lethal takes occur as a result of the capture, they will not exceed 3 loggerheads, 2 Kemp's ridleys, 2 greens, 2 leatherback, 2 hawksbill, 2 olive ridley and 2 unidentified/hybrid sea turtles for the duration of the permit. These take levels are based on previously allowed take levels adjusted for potential increased effort through the duration of the permit. Previous testing near Cape Canaveral, Florida, resulted in the incidental capture of 133 sea turtle captures from 2002-2006 (NMFS unpublished data). Loggerheads were the most frequently observed species but Kemp's ridley, leatherback, and green sea turtles were also observed. In 2017, we plan to conduct up to 20 gear evaluation trials resulting in approximately 1,600 hours of trawling effort, which is similar to effort in previous years. In recent years, we have been conducting approximately 80 days of dependent contract commercial trawl work per year and 60 days of independent trawl work. However, variations in funding, vessel availability, and environmental conditions make estimating effort difficult from year to year. Emerging fishery needs could result in increased trawling levels of up to 75% over previous levels under Project A, as well as unforeseen hook-and-line gear testing needs under Project B. Specific take levels by species per gear evaluation trial are highly variable due to a variety of factors, including species abundance, distribution, foraging resource availability and distribution, and environmental conditions. The take levels requested would allow this critical research to continue at the current level of effort, while experiencing a limited number of sea turtle interactions. All turtles are expected to be captured only once and all turtles will be handled and sampled in accordance with the methods in NMFS-SEFSC-TM-579 SEFSC Sea Turtle Research Techniques Manual (SEFSC 2008).

Given the opportunistic nature of fishery effort and funding, as well as the potential for emerging management needs, a specific breakdown of research effort allocation is difficult to provide beyond what we have detailed in the tables here. Because this research is solely based on fishery gear testing conducted to develop and evaluate effective bycatch mitigation gears and techniques, all takes are incidental rather than directed. Therefore, it would not be appropriate to compare the requested turtle take levels to the statistical analysis used to determine if the research is valid (i.e., in generating statistically appropriate sample sizes which is based on target catch and gear performance needs).

The requested levels were based on anticipated effort levels for planned research and catch rates from previous work. In fisheries or geographic strata with no catch rate data,

proxies were used based on similar gear types. However, fishery effort is highly variable inter-annually and depends on availability of target catch. This makes research planning difficult and requires testing to be done opportunistically based on fishery effort, so the exact level of annual research effort is difficult to quantify. As well, this work is driven by responding the most critical fishery management needs at the time, as well as available funding. Therefore, effort may shift from testing in one sector to another with a more urgent need from year to year, and all projects will not be occurring simultaneously. Because of the inherent need for flexibility in this research program to meet time sensitive fishery management research needs, we cannot allocate the requested takes by sector in finer detail than at the Project level. The cumulative take numbers in the requested take tables represent careful consideration based on previous research, catch rates or proxy catch rates, and realistic effort capacity, which is constrained by vessel and staff availability, as well as funding.

Project B: Evaluation of Longline Gear Alternatives

This project will involve fishery dependent evaluations of alternatives to longline fisheries, concentrating on longline gear alternatives designed to mitigate sea turtle interactions. Hook and line gear such as "Greenstick" gear (an actively trolled mainline attached to a vessel and elevated above the surface with no more than 10 hooks or gangions attached to a mainline; retrieved by hand or mechanical means) will be evaluated as an alternative to traditional longline gear. Greenstick gear is currently used off the coast of North Carolina to target yellowfin tuna, and the gear attracts target fish to the disturbance created by towing a 'bird' at the surface, and the gear is trolled at speeds higher than turtles would normally pursue. Because of the active trolling technique and the minimal number of hooks used, sea turtle interactions are unlikely with this gear. A detailed description of planned greenstick gear evaluations follows.

We will also conduct technology transfer training programs that provide fishers with information and training regarding gear handling techniques; safe turtle release equipment, and protocols that deal with protected species interactions. The scope of work for this project in both the Atlantic and Gulf of Mexico will include the development and evaluation of mitigation techniques, including the introduction of safe handling and release equipment to safely release sea turtles and other bycatch species in all fisheries aboard commercial fishing vessels. New release and handling equipment prototypes will be developed in the laboratory prior to field testing on live animals. Upon successful completion of laboratory and subsequent field trials, prototypes will be recommended for use aboard commercial vessels and will be included in future technology transfer training programs.

The proposed project will begin on January 1, 2017 and will be completed on December 31, 2021. Locations for Project B will be in the coastal and offshore waters of the Western Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. Because the work will be fishery dependent, specific areas of operation and, thus, locations of takes will be determined by the location of target catch aggregations at the time of a given trip.

Green-stick Gear Evaluation

The Gulf of Mexico pelagic longline yellowfin tuna fishery is known for producing large, high-quality tuna. Yellowfin tuna caught in the Gulf of Mexico are generally graded into three categories, or grades. Tuna grading is dependent on fish size and quality of the flesh. Sushi grade, or #1, is the highest quality with #3 being the lowest. Tuna that are below 60 lb (27 kg) dressed weight are considered "no-grade" tuna due to a lower myoglobin content in the flesh. High myoglobin content is responsible for the intense red color in the flesh of larger fish. No-grade fish receive the same ex-vessel price as grade #3 tuna, approximately 80% less than sushi grade. Sushi grade tuna make up the majority of revenue generated by the Gulf of Mexico pelagic longline fishery.

Preliminary results of testing with green-stick gear in the Gulf of Mexico indicates that the majority of the yellowfin landed are smaller than 60 lb dressed weight and are classified as no-grade. Additionally, tuna caught with greenstick gear on average grade lower than those caught on longlines due to poor flesh quality. Troll fisheries such as

green-stick gear that target tuna are plagued by a product quality problem known as "burnt tuna syndrome". Burnt tuna has a pale, soft flesh and a slightly sour taste. Although perfectly palatable when cooked or canned, burnt tuna is considered unsuitable for raw consumption and commands only a fraction of the price of prime quality fish. The burnt tuna condition also results in a reduced shelf life. Shortly after tuna become hooked, high levels of catecholamines are released in the blood stream. Fish landed during the peak of its blood catecholamine concentrations have the greatest propensity for becoming burnt (Watson et al. 1998). Burnt tuna rarely occurs in longline caught tuna where they often remain in the water for several hours before landing. Catecholamines are rapidly cleared from the blood through the gills (Nekvasil and Olson 1986). The half-life of catecholamines in the bloodstream is approximately 30 minutes. It is hypothesized that, in a longline-caught fish remaining in the water for several hours, plasma catecholamines are reduced to low levels before the fish is landed (Davie and Sparksman 1986). To improve the quality of tuna, Gibson (1981) recommends that handline-caught fish be attached to a buoy and left for an hour prior to being brought on board.

In order to develop an economically viable greenstick fishery in the Gulf of Mexico, research is needed to address the smaller fish size and lower flesh quality of the tuna caught on green-stick gear.

Research Objectives:

- Obtain behavioral observations of yellowfin tuna interactions with greenstick gear
- Compare fish handling practices and the effects on fish quality
- Compare size composition of longline and greenstick caught yellowfin tuna under homogenous spatial and temporal conditions.

Fisheries independent research:

Fisheries independent research will be carried out on a fisheries research vessel or contracted commercial vessel. The vessel will be outfitted with green-stick gear. Fisheries data collected by scientists onboard the research vessel using green-stick gear will include catch, bycatch, gear configuration, bait type and quantity, fishing time, number of hooks, location, water depth, water temperature. The vessel will be outfitted with a Trollpro camera system in order to obtain subsurface behavioral observations of tuna that are attracted to the fishing gear. The Trollpro is a high speed trolling video system designed to obtain behavioral observations of large pelagic fish interacting with fishing gear. The observations will indicate if size specific tuna behaviors exist when attracted to the gear. This technology can also be used to quickly ascertain the effect of any fishing gear modifications that are made during experimentation.

The tuna processing experiment will be based on the recommendation of Gibson (1981). Yellowfin that are caught will be handled one of two ways. Randomly selected fish will be immediately brought on board, bled and processed in a manner consistent with pelagic longline operations. Fish not immediately brought on board will be tethered to a unit of buoy gear with approximately 200 ft of main line and left to free swim for a predetermined period of time (1 or 2 hrs). Trolling will continue during tuna "cool down" periods with the vessel maintaining visual or radar contact with the bouy gear. After the predetermined period has passed, the tethered fish will be retrieved processed in the same way as with the other treatment group. At the end of each trip, tuna will be landed and "blind graded" to compare the flesh quality the two treatment groups.

Research cruises will take place in the northern Gulf of Mexico from May to September. Up to 20 days of gear testing will be conducted annually for the duration of the permit. Incidental sea turtle captures are not expected in this project based on the lack of reported takes on this gear type in the fishery. However, since bycatch is reported in other hook-and-line fisheries, we are requesting these incidental takes in the unlikely event that an incidental capture occurs. We request to take juveniles, subadults, and adults of both sexes with live takes not to exceed 30 loggerheads, 10 Kemp's ridleys, 30 leatherbacks, 10 greens, 10 hawksbills, 10 olive ridleys, and 10 unknown/hybrid turtles. All turtles are expected to be captured only once, and all turtles will be handled and sampled in accordance with the methods in NMFS-SEFSC-TM-579 SEFSC Sea Turtle Research

Techniques Manual (SEFSC 2008). If a recapture occurs, they will be identified and released without additional sampling. No lethal takes are expected in this project. Under this project, we have not regularly conducted work on an annual basis, but we are conducting Longline Alternative Gear research under early restoration plans. Effort will vary depending on funding availability and managements, and variation from previous levels can fluctuate as much as 75%.

Methods Capture:

Project A: Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries (Table 1)

Turtles taken during this project will be captured by otter trawl, skimmer trawl, wing net, or butterfly net gear set for fish or shellfish in the mid-Atlantic and Gulf of Mexico. During trawl sets to evaluate experimental TED installations, the incidental capture of sea turtles will be highly unlikely, as the experimental TED will incorporate the minimum required opening dimensions for offshore waters, i.e., those large enough to exclude leatherback sea turtles or minimum dimensions for inshore waters. In some instances, trawls may be set without TEDs as a means of comparing target catch rates to sets made with a TED. Trawl sets made without TEDs have the potential to capture sea turtles. Turtles may be captured by bottom trawls while foraging or resting on the bottom or in the water column as a bottom trawl as it is deployed or retrieved. NOAA divers involved in TED development have observed the behavior of sea turtles overtaken by trawls. In some instances, captured turtles may be capable of out swimming a trawl and escaping. More likely, turtles that are overtaken actively seek an escape, moving from side to side in the trawl, making contact with the trawl webbing. As the turtle tires, it cannot keep pace with the trawl movement and steadily falls toward the codend section or bag, where it will remain until the trawl is retrieved. When a turtle is captured, its presence in the trawl may not be noted until after the trawl has been retrieved in its entirety and the catch is removed, or dumped, on the deck of the vessel. The turtle will likely be mixed in with substantial amounts of fishery target catch.

As a component of this project, some fishery independent trawling is expected to be conducted. This work will involve the use of a NOAA research vessel or a chartered commercial trawler (vessels would range in size from 7 m to 40 m) to investigate candidate TED efficiency in excluding sea turtles. This work is conducted by mounting underwater cameras on a trawl in and around the candidate TED as a means of obtaining video of wild turtle escapement. This work will be conducted in a limited number of locations which are known to have high sea turtle abundance during certain times of the year. These locations include the Cape Canaveral, FL shipping channel and the offshore waters of the Georgia and South Carolina. Work may be conducted from October through April. Trawl types used for this work may include: traditional 2 and 4 seam shrimp trawls with headrope lengths up to 70 ft; flounder trawls with headrope lengths up to 120 ft; and fly nets with headrope lengths up to 150 ft and skimmer trawls with headrope lengths up to 30 ft.

The species of turtles that could be taken during this project include loggerhead, green, leatherback, Kemp's ridley, hawksbill, and olive ridley. The proposed research will occur in the Western Atlantic from Southern Florida to New York and the Gulf of Mexico in water depths ranging from 40 to 200 m. Turtles taken during this project will be captured by bottom or midwater trawling gear set for fish or shellfish. During trawl sets that are conducted to evaluate experimental TED installation, the incidental capture of a sea turtle will be highly unlikely, as the experimental TED will incorporate the minimum required opening dimensions for either offshore waters or inshore waters. During trawl sets in which a TED is not installed in the trawl (i.e., tows to assess target catch rates without a TED), one of two methods to ensure a non-lethal turtle interaction will be employed. The first method will involve a tow time limitation as described below, while the second will involve the use of a real time video monitoring system that will allow the researchers to know when a turtle enters the codend section of the trawl. The use of a RF (radio frequency) real-time video monitoring system to detect turtle interactions during non-TED trawl sets in water depths of 50 meters or less transmits real time video signals from the trawl to the towing vessel via a camera-to-surface cable. The terminal end of the cable is tethered to a float at the surface that houses an RF signal processor and transmitter (antennae). The video signal is then transmitted to the towing vessel where it is monitored by project personnel. The RF camera will be placed in the section of the trawl in which a TED would be installed (extension piece). This area typically has the smallest trawl diameter. The placement of the camera in this area will allow the observer to view all objects that are in transit to the codend section. When a turtle is observed in the trawl with the RF camera system, the vessel captain will be instructed to commence haul back of the gear immediately to facilitate recovery of the animal. NMFS has used the RF video system successfully for trawl observations of captured turtles during TED tests conducted aboard the R/V Georgia Bulldog from 2002 to 2004.

In state waters with contracted vessels, all captures will be authorized under this permit and not the ITS of a Biological Opinion. In these cases, trawl gear without TEDs will be towed for no longer than 30 minutes unless specific fisheries regulations exist requiring tow time limits in lieu of TEDs. In these cases, tow time limits will match those set by regulations, such as the skimmer trawl fishery, which has a 55-minute tow time limit. Testing must be conducted under commercial conditions and shorting tow time limits would potentially bias results of the testing. As an alternative, real-time video cameras may be used to observe the capture of animals which will allow researchers to remove turtles from the nets within 20 minutes of capture. Trawling will not be initiated when marine mammals (with the exception of dolphins or porpoises) are observed in the vicinity and researchers will make every effort to prevent interactions with all marine mammals.

During skimmer trawl operations, a minimum of two staff, one on each side (port/starboard) of the vessel, will inspect the gear every five minutes to monitor for the presence of marine mammals. Prior to retrieving skimmer trawl tail bags, the vessel will be slowed from the active towing speed to 0.5 to 1.0 kts to allow animals that may be in the net to escape. In addition, video monitoring of the trawl will be used when conducting trawl testing in the vicinity of Duck, NC. If a sturgeon is observed in the net, researchers will immediately haul the gear and carefully release the fish as quickly as possible to avoid injury, following sturgeon careful handling guidelines.

Turtles may be captured by the following trawl types:

Flynets and other High Opening Bottom Trawls

Flynets and other high opening bottom trawls vary in mesh size and headrope length depending on the targeted catch. Flynets are typically two-seam fish trawls constructed of graduated mesh sizes beginning with large mesh (16", 32", or 64" stretched mesh) in the wings of the trawl following a slow 3:1 taper to smaller mesh sizes in the body, extension, and mesh sizes as small as 3-inch in the codend or bag section. The trawls are bottom tending with net sizes ranging from 80 to 100 feet (headrope length). Vertical height of these trawls when fished may be as much as 30 feet. Flynet vessels are single-rigged (towing one trawl) using a net reel for storage. Tow speeds are often between three and four knots with tow durations ranging from 10 minutes to several hours. High opening bottom trawls which are used to target scup and black sea bass may have headrope lengths as long as 150 ft. and mesh sizes up to 40 ft. Similar in general design, but of much smaller headrope size (40-75 ft.) are trawls used to target inshore *Loligo* squid.

Crab Trawl Fishery

Crab trawls are typically heavily chained 2 seam nets with headrope lengths from 25 to 50 ft depending on vessel size. Mesh sizes are required to be no smaller than 3 in. and no greater than 4-in. stretched mesh. The vertical opening of the trawl is approximately 3 ft and towing speed range from 2 to 4 knots depending on the horsepower of the vessel.

Shrimp trawls

Shrimp otter trawls are typically 4-seam or 2-seam in construction with headrope lengths from 12-ft to 100 ft. depending on vessel size and location fished (inshore vs. offshore). Mesh sizes are fairly uniform throughout the Atlantic and Gulf of Mexico, ranging from 1.25 in. to 2 in. The vertical opening of a shrimp trawl is dependent on the target species of shrimp and may range from 3 ft for trawls target Brown (Farfantepenaeus aztecus) and Pink (Penaeus duorarum) shrimp to 16 ft for trawls targeting white shrimp (*Litopenaeus setiferus*). Towing speeds vary from 2 to 3 knots depending on size and horsepower of the towing vessel and personal preference of the fisher.

Skimmer trawls

Skimmer trawls are used exclusively in the inshore waters of all states where the gear is allowed (Louisiana, Mississippi, Alabama, Florida, and North Carolina). Originally designed to catch white shrimp by fishing the entire water column, today skimmers may also be rigged with low opening nets and are used to target brown shrimp. The trawl is

held open by a metal framework and is fished on the bottom. Skimmer trawls are "pushed" along the side of the vessel, rather than towed as conventional trawl gear. This allows the vessel operator to maneuver the nets in confined areas such as bayous and sloughs or along the edge of channels. Because skimmers are typically rigged to fish higher in the water column, the potential for turtle capture may be greater than a lower opening otter trawl. The catch may be retrieved and dumped without interruption of the towing process as the codends may be lifted to the deck of the boat without raising the entire net out of the water. The size of a skimmer trawl is regulated by each state and can vary from 15 to 30 ft. in horizontal opening.

Butterfly/Wing Nets

Butterfly nets, sometimes called "wing nets" consist of a square metal frame that forms the mouth of the net. Webbing is attached to the frame and tapers back to a codend. The nets can be fished from a stationary platform or a pair of nets can be attached to either side of a vessel. The vessel is then anchored in a tidal current to capture emigrating shrimp, or the nets are pushed through the water by the vessel. As with skimmer trawls, the catch may be picked up and dumped without raising the entire net out of the water.

Project B: Evaluation of Longline Gear Alternatives (Table 2)

Sea turtles taken on longline fishery gear are either foul hooked, entangled, hooked in the mouth/beak, or have swallowed the hook. Leatherback sea turtles do not normally ingest the bait, but become entangled in the main and branch lines, and are usually released alive (Williams et. al 1996, Garrison 2003). Most are foul hooked externally, often in the shoulder, armpit, and flipper areas. Loggerhead turtles frequently consume the bait and become hooked in the mouth or swallow the hook. Almost all loggerhead turtles are released alive, but they are sometimes released with hooks still embedded in their mouths or lower in the GI tract when hook removal is not possible, and survival rates are unknown.

Researchers will fish gear within fishery guidelines, and all captures of sea turtles will occur in a fishery and are authorized by the ITS of the biological opinion done for the fishery. All fisheries would be federally managed or regulated. Alternatives to longline gear such as "Greenstick Gear" will be explored. Sea turtle bycatch with these alternative gears is expected to be unlikely.

Handling and Sampling:

All turtles will be handled and sampled in accordance with the methods in NMFS-SEFSC-TM-579, the SEFSC Sea Turtle Research Techniques Manual (SEFSC 2008). Each captured animal will be assessed for general health condition and identified, and then as appropriate they will be measured, photographed, weighed (when possible) biopsied (skin), PIT and flipper tagged, and released. Multi-frequency PIT tag readers will be used to scan for existing tags, and if a turtle is encountered without tags, they will be marked with two inconel flipper tags and one 125 - 134.2 kHz PIT tag. The tagging site will be disinfected using a povidone-iodine swab, an isopropyl alcohol swab, another povidone-iodine swab, and a second alcohol swab. Flipper tags will be cleaned prior to use and applied along the trailing edge of the rear flippers just proximal to the first scale. PIT tags will be applied in the triceps superficialis muscle on hardshells and in the dorsal musculature of the forelimb in leatherbacks. Boated turtles will have a 6mm tissue biopsy taken from the trailing edge of a rear flipper using a sterile biopsy punch, after the site has been disinfected using a povidone-iodine swab, an isopropyl alcohol swab, another povidone-iodine swab, and then a second alcohol swab. The minimum size turtle that we would PIT or flipper tag is 30 cm SCL.

Photographs and morphometric data will be archived by the SEFSC. Biopsy samples collected for genetic and stable isotope analysis will be cataloged and sent to the National Sea Turtle Genetics Laboratory in La Jolla, California. Tagging data, including PIT tag data, will be archived with the Cooperative Marine Turtle Tagging Program, currently managed by the Archie Carr Center for Sea Turtle Research at the University of Florida.

In the event of a gear interaction, turtles will be handled according to gear removal protocols in NMFS-SEFSC-TM-580, Careful Release Protocols for Sea Turtle Release with Minimal Injury (SEFSC 2010).

Salvage of Parts and Import/Export Activities:

NMFS SEFSC currently holds an ESA/CITES permit #15US045532/9 to import salvaged sea turtle carcasses and parts and tissue samples from live animals from the high seas and foreign ports. All carcasses salvaged and biopsy samples obtained from animals taken during commercial fishing operations and NMFS research activities, generally on the high seas of the Atlantic Ocean under Project B (e.g., previous importations have occurred during pelagic longline research on the high seas), will be landed in U.S. ports in almost all cases. We do not intend to ship the carcasses or biopsy samples back to the U.S. from foreign ports of landing except in rare cases, where proper CITES procedures will be followed.

Wild animals incidentally captured and killed as a result of interaction with fishing gear while NMFS-permitted researchers are aboard will be salvaged, stored on ice or frozen and returned to shore for scientific studies in cases where this is possible. These carcasses otherwise would be returned dead to the sea. Wild turtles incidentally captured alive as a result of interaction with fishing gear during NMFS-permitted directed research, will have biopsy tissue samples (6-8 mm) taken for genetic analysis and scientific study.

The purposes of the scientific studies include health assessment and demographic studies. We do not propose to purposefully take protected sea turtles, just to fully utilize those that are incidentally captured or killed during observed fishing operations. These researchers all will be working under a NMFS permit and with fisheries/research activities for which there has been a Biological Opinion issued and an ESA Section 7 consultation with NMFS. The pelagic stage of sea turtles, found on the high seas, is a life stage for which there is little information, and much more is needed to make management decisions about activities impacting this stage.

The purpose of import is to conduct genetic analysis in order to determine population structure and identify stock origin of sea turtles at key forage areas, migratory corridors as well as stock origin of stranding and fisheries bycatch. These are priority actions in the NMFS-USFWS Recovery Plans for sea turtles, and the results of these studies will allow identification of fisheries that are impacting declining nesting stocks, as well as forage areas and migratory corridors that are linked to different nesting stocks. This information will directly enhance recovery efforts on behalf of these endangered species.

Any carcasses retrieved will be bagged and shipped on ice in coolers. Once landed at a U.S. port, biopsy samples and carcasses will be shipped to NMFS facilities along the U.S. east and Gulf Coast for necropsy by staff holding current NMFS and/or USFWS permits. A comprehensive examination including measurements will be conducted on all animals. Tissue samples will be taken from non-frozen animals for histopathological examination and for contaminant analyses. We will attempt to identify the mechanism of death (e.g., drowning, hook puncture of major blood vessel, etc.) for any carcass. Hard parts will be salvaged for aging and life history studies. Tissue biopsies will be collected for genetic studies. Gut contents will be salvaged for diet studies.

Previous Permits

Previously, the research activities of the SEFSC have been conducted under ESA Section 10 permits #1260, #1570, and #16253 (active) issued by NMFS. The research activities of the SEFSC also are permitted by the USFWS: ESA Section 10 TE676379-5 (active), Designated Port Exception Permit #LE046715-0 (active), and CITES #15US045532/9 (active).

Fishery Background Information

Project A: Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries

Each of the fisheries noted above has the potential for incidentally capturing sea turtles. Several of the fisheries have been the subject of ESA Section 7 Consultations, which contain specific recommendations regarding the development of TEDs to mitigate sea turtle interactions. Fisheries without modified gear that operate in areas and during seasons where turtle interactions are likely are high priorities because of the lack of modifications and the need to test potential bycatch mitigation gear modifications. However, this is a state water fishery and effort is sporadic. Testing opportunities are also sporadic based on fishery effort. Because there is no observing in this fishery, there is no available take estimate available for the fishery. Most of these gear types operate under the Shrimp Fishery Biological Opinion (otter trawl, skimmer trawl, butterfly/wing net trawl). The flynet fishery operates under the Atlantic Croaker FMP, groundfish is a state fishery where capture coverage would be authorized under this permit. Inshore trawling is not covered under a Federal BiOp or FMP.

Mid-Atlantic Region

In the flynet fishery, TEDs are not required. Sea turtle takes with this gear type have been documented. TED development for this fishery has been ongoing since 2001, and implementation of the device in the fishery is imminent. The project proposes to conduct additional operational testing of prototype TEDs. A Section 7 Biological Opinion for the summer flounder, scup and black sea bass fishery (2001) acknowledges TED development for the flynet fishery with the following statement: "NMFS is also working to develop a TED that can be effectively used in a type of trawl known as a flynet, which is sometimes used in the Mid-Atlantic and northeast fisheries for summer flounder, scup, and black sea bass. Regulations will be formulated to require use of TEDs in this fishery if observer data demonstrate a need for such TEDs." Additionally, a fisheries management plan for weakfish, a species targeted by the flynet fishery, states that more trawl gear research is needed to minimize fishery impacts on sea turtles (Atlantic States Marine Fisheries Commission 2002).

The crab trawl fishery primarily operates in nearshore and inshore waters of North Carolina using bottom trawls to target wintering crab populations. Although TEDs are not required, this fishery occurs at times and in areas where sea turtles occur. As part of the Strategy for Sea Turtle Conservation (Strategy), NMFS is investigating the feasibility of TED use in all trawl fisheries that overlap with sea turtle populations. The crab trawl fishery has been prioritized as a fishery to be addressed during the next few years. This project will investigate the feasibility and performance of TED use in the crab trawl fishery.

The penaeid shrimp fishery utilizes bottom trawls in inshore, nearshore and offshore areas out to 45 fm. While the full time use of TEDs is required for this fishery, future work under this project may require evaluations of TED modifications to improve TED efficiency for turtle exclusion and shrimp retention. Additional gear types used to capture shrimp include skimmer, butterfly, and wing trawls. These gear types are currently exempt from the TED requirement. Vessel operators must adhere to tow times when using these types of nets. However, Scott-Denton et al (2007) found that tow times were often exceeded and averaged 102 min during the 2004-2005 study. This determination combined with a large number of localized strandings attributed to the skimmer trawl fishery in Mississippi during the 2010 shrimp season have prompted managers to consider TED requirements for all skimmer trawls in the near future. This project will investigate the feasibility and performance of TEDs in skimmer, butterfly, and wing trawls.

Gulf of Mexico

In the Gulf of Mexico, the penaeid shrimp fishery utilizes bottom trawls in inshore, nearshore and offshore areas out to 45 fm. While the full time use of TEDs is required for this fishery, future work under this project may require evaluations of TED modifications to improve TED efficiency for turtle exclusion and shrimp retention. Additional gear types used to capture shrimp in the Gulf of Mexico include skimmer, butterfly, and wing trawls. These gear types are currently exempt from the TED requirement. Vessel operators must adhere to tow times when using these types of nets. However, Scott-Denton et al (2007) found that tow times were often exceeded and averaged 102 min during the 2004-2005 study. This determination combined with a large number of localized strandings attributed to the skimmer trawl fishery in Mississippi during the 2010 shrimp season have prompted managers to consider TED requirements for all skimmer trawls in the near future. This project will investigate the feasibility and performance of TEDs in

skimmer trawls and butterfly nets.

A limited number of vessels in the Gulf of Mexico target bottom and demersal fish species such as croaker and spot. Other species which are targeted include rough scad, butterflyfish and blue runner. These vessels employ high opening bottom trawls with headrope lengths up to 120 ft. in length. Smaller sized vessels, operating in nearshore and inshore waters of the central Gulf target black drum and blue crab during winter months. These vessels may use standard shrimp trawl designs as their primary trawl type with headrope lengths from 25 to 65 ft. in headrope length.

Project B: Evaluation of Longline Gear Alternatives

As a result of previous pelagic longline research (see project background section), regulations were promulgated in 2004 to implement sea turtle mitigation measures into the U.S. pelagic longline fisheries. These requirements included the use of large (16/0 or larger) circle hooks with minimal offset (0° or 10°), and required the use of careful release protocols and tools for gear removal and handling. The use of turtle-safe gear and techniques utilized as an alternative to pelagic longline fisheries has been developed along the East Coast of the U.S. Green-stick gear is currently used off the coast of North Carolina to target yellowfin tuna. The gear trolls a series of hooks an actively trolled mainline attached to a vessel and elevated above the surface with no more than 10 hooks or gangions attached to a mainline; retrieved by hand or mechanical means. Because of the active trolling technique and the minimal number of hooks used, sea turtle interactions are unlikely with this gear.

Supplemental Information

Status of Species:	<p>All 7 species of marine turtles are listed under the Endangered Species Act (ESA); 6 of those species fall under the jurisdiction of the NOAA Fisheries Office of Protected Resources. Green turtles and olive ridley turtles have breeding populations that were listed separately under the ESA, and therefore, have more than one ESA status.</p> <p>Chelonia mydas: Threatened distinct population segment (DPS): North Atlantic. CITES Appendix I.</p> <p>Eretmochelys imbricata: Endangered. CITES Appendix I.</p> <p>Lepidochelys kempii: Endangered. CITES Appendix I.</p> <p>Dermochelys coriacea: Endangered. CITES Appendix I.</p> <p>Caretta caretta: Threatened DPS: Northwest Atlantic Ocean. CITES Appendix I.</p> <p>Lepidochelys olivacea: Threatened in the Atlantic. CITES Appendix I.</p> <p>Acipenser brevirostrum: Endangered. CITES Appendix I.</p> <p>Acipenser oxyrinchus desotoi: Threatened. CITES Appendix II.</p> <p>Acipenser oxyrinchus oxyrinchus: Endangered DPS: New York Bight, Chesapeake Bay, Carolina and South Atlantic. CITES Appendix II.</p> <p>Pristis pectinata: Endangered US DPS. CITES Appendix I.</p>
Intentional Lethal Take:	<p>No intentional lethal take is involved as a result of the proposed activities. In the rare event that unintentional lethal takes do occur, they are not expected to exceed 3 loggerhead, 2 Kemp's ridley, 2 green, 1 leatherback, 1 hawksbill, and 1 olive ridley sea turtles. Unintentional mortalities may be caused by forcible submergence and drowning during independent trawl captures operated by or contracted by researchers (i.e., not in commercial fisheries).</p>

Anticipated Effects on Animals:

One of the risks to sea turtles from capture in trawl gear is forced submergence. Sea turtles forcibly submerged in any type of restrictive gear eventually suffer fatal consequences from prolonged anoxia and/or seawater infiltration of the lung (Lutcavage et al. 1997). A study examining the relationship between tow time and sea turtle mortality showed that mortality was strongly dependent on trawling duration, with the proportion of dead or comatose turtles rising from 0% for the first 50 minutes of capture to 70% after 90 minutes of capture (Henwood and Stuntz 1987). However, metabolic changes that can impair a sea turtles ability to function can occur within minutes of a forced submergence. While most voluntary dives appear to be aerobic, showing little if any increases in blood lactate and only minor changes in acid-base status, the story is quite different in forcibly submerged turtles where oxygen stores are rapidly consumed, anaerobic glycolysis is activated, and acid-base balance is disturbed, sometimes to lethal levels (Lutcavage and Lutz 1997). Forced submergence of Kemp's ridley sea turtles in shrimp trawls resulted in an acid-base imbalance after just a few minutes (times that were within the normal dive times for the species) (Stabenau et al. 1991). Conversely, recovery times for acid-base levels to return to normal may be prolonged. Henwood and Stuntz (1987) found that it took as long as 20 hours for the acid-base levels of loggerhead sea turtles to return to normal after capture in shrimp trawls for less than 30 minutes. This effect is expected to be worse for sea turtles that are recaptured before metabolic levels have returned to normal. The NRC (1990) has suggested that physical and biological factors that increase energy consumption, such as high water temperatures and increased metabolic rates characteristic of small turtles would be expected to exacerbate the harmful effects of forced submergence from trawl capture. Recent research in Spain has identified decompression sickness and gas embolism in forcibly submerged loggerheads at depth or for extended soak durations of ~12 hours (García-Párraga et al. 2014), but given the shallower average depths of these hauls in combination with short tow durations, we do not anticipate decompression sickness to be an issue in our research.

Measures to Minimize Effects:

During trawl sets in which a TED is not installed in the trawl (i.e., tows to assess target catch rates without a TED), one of two methods to ensure a non-lethal turtle interaction will be employed. The first method will involve a tow time limitation as described below, while the second will involve the use of a real time video monitoring system that will allow the researchers to know when a turtle enters the codend section of the trawl. The use of a RF (radio frequency) real-time video monitoring system to detect turtle interactions during non-TED trawl sets in water depths of 50 meters or less transmits real time video signals from the trawl to the towing vessel via a camera to-surface cable. The terminal end of the cable is tethered to a float at the surface that houses an RF signal processor and transmitter (antennae). The video signal is then transmitted to the towing vessel where it is monitored by project personnel. The RF camera will be placed in the section of the trawl in which a TED would be installed (extension piece). This area typically has the smallest trawl diameter. The placement of the camera in this area will allow the observer to view all objects that are in transit to the codend section. When a turtle is observed in the trawl with the RF camera system, the vessel captain will be instructed to commence haul back of the gear immediately to facilitate recovery of the animal. NOAA Fisheries has used the RF video system successfully for trawl observations of captured turtles during TED tests conducted aboard the R/V Georgia Bulldog from 2002 to 2004.

In state waters with contracted vessels, trawl gear without TEDs will be towed for no longer than 30 minutes unless specific fisheries regulations exist requiring tow time limits in lieu of TEDs. In these cases, tow time limits will match those set by regulations, such as the skimmer trawl fishery, which has a 55 minute tow time limit. Testing must be conducted under commercial conditions and shorting tow time limits would potentially bias results of the testing. As an alternative, real-time video cameras may be used to observe the capture of animals which will allow researchers to remove turtles from the nets within 20 minutes of capture. Trawling will not be initiated when marine mammals (with the exception of dolphins or porpoises) are observed in the vicinity and researchers will make every effort to prevent interactions with all marine mammals.

During skimmer trawl operations, a minimum of two staff, one on each side (port/starboard) of the vessel, will inspect the gear every five minutes to monitor for the presence of marine mammals. Prior to retrieving skimmer trawl tail bags, the vessel will be slowed from the active towing speed to 0.5 to 1.0 kts to allow animals that may be in the net to escape. In addition, video monitoring of the trawl will be used when conducting trawl testing in the vicinity of Duck, NC. If a sturgeon is observed in the net, researchers will immediately haul the gear and carefully release the fish as quickly as possible to avoid injury, following sturgeon careful

handling guidelines.

Capture/Handling/Restraint

Leatherbacks

Leatherbacks will only be boated if they can be easily and safely brought on board the vessel. Leatherback turtles will be handled by at least two people, one on either side of the turtle, and precautions will be taken to ensure that animals are supported from underneath and not turned on their back.

Project A: Turtle Excluder Device (TED) Evaluations in Atlantic and Gulf of Mexico Trawl Fisheries

While we anticipate the majority of the trawl sets proposed in Project A will involve the use of a prototype TED, designed for the exclusion of large turtles including leatherbacks, some of the trawl sets may be conducted without TEDs as a means of evaluating the TED effect on the catch of target species. The researchers feel that the risk of potentially capturing a turtle during this project is low, and such risk is worthwhile if it will lead to the successful development of TEDs for fisheries in which TEDs are not used currently. In order to minimize stress to a turtle that may be captured in a trawl set without a TED, the researchers propose to use the following measures:

- 1) The use of a RF (radio frequency) real-time video monitoring system during non-TED trawl sets in water depths of 50 meters or less. The RF video system transmits real time video signals from the trawl to the towing vessel via a camera-to-surface cable. The terminal end of the cable is tethered to a float at the surface that houses an RF signal processor and transmitter (antennae). The video signal is then transmitted to the towing vessel where it is monitored by project personnel. The RF camera will be placed in the section of the trawl in which a TED would be installed (extension piece). This area typically has the smallest trawl diameter. The placement of the camera in this area will allow the observer to view all objects that are in transit to the codend section. When a turtle is observed in the trawl with the RF camera system, the vessel captain will be instructed to commence haul back of the gear immediately to facilitate recovery of the animal. NOAA Fisheries has used the RF video system successfully for trawl observations of captured turtles during TED tests conducted aboard the R/V Georgia Bulldog from 2002 to 2004.
- 2) The use of limited tow times may be employed during some trawl sets without a TED to reduce the risk of stress to a captured turtles. The length of tow times will be in accordance with tow time limitations set for trawl gear that are exempt from TED use.

Project B: Modifications to Longline Fisheries Gear

The effects of each of the procedures conducted on the turtles once boated are expected to be minimal, and details are addressed in the attached SEFSC Sea Turtle Research Techniques Manual and below.

Tagging and biopsy sample collection

Only minor stress, discomfort, and pain are expected during sample collection. The effect of each proposed procedure is described in detail in the attached SEFSC Sea Turtle Research Techniques Manual. All equipment that comes into contact with sea turtle body fluids, cuts or lesions will be disinfected between the processing of

each turtle using a 1:10 solution of 5-6% bleach or other appropriate disinfectant. A separate set of sampling equipment for handling animals displaying fibropapilloma tumors will be maintained and thoroughly disinfected if ever used. Tagging and biopsy sites will be disinfected using a 10% povidone-iodine swab, an isopropyl alcohol swab, another povidone-iodine swab, and a second alcohol swab.

This permit application has been reviewed and approved by the Institutional Animal Care and Use Committee (IACUC), and an approval letter is attached.

Discuss effects on non-target species in the study area, including estimated numbers by species of potential non-target bycatch, and what this estimate is based on, and steps taken to minimize effects.

Marine Mammals (Cetaceans)

Trawling will not be initiated when marine mammals (with exception of dolphins or porpoises) are observed within the vicinity of the research, and the marine mammals will be allowed to either leave or pass through the area safely before trawling is initiated. Every effort will be made to prevent interactions with all marine mammals. Should a marine mammal become captured, research will be stopped immediately and the animal will be freed. All captures will be reported as soon as possible. During skimmer trawl operations, a minimum of two staff, one on each side (port/starboard) of the vessel, will inspect the gear every five minutes to monitor for the presence of marine mammals. Prior to retrieving skimmer trawl tail bags, the vessel will be slowed from the active towing speed to 0.5 to 1.0 kts to allow animals that may be in the net to escape.

Manatees

Although manatee interactions are not anticipated, all vessel personnel will be informed that it is illegal to intentionally take manatees. Crew involved in research will keep a look out for manatees at all times. If a manatee is sighted within 100 meters of the vessel, all activities will stop. If a manatee is incidentally captured, the vessel will be stopped and all engines turned off or put in neutral. Proper release guidelines will be followed and the capture will be reported immediately.

Sturgeon Handling Requirements

Although sturgeon interactions are not expected, if captured incidentally during the course of research, it will be disentangled and released immediately. If possible, all individuals will be kept in the water and returned to neutral buoyancy prior to release. In addition, video monitoring of the trawl will be used when conducting trawl testing in the vicinity of Duck, NC, where 75 Atlantic Sturgeon were encountered on a single tow during research conducted in January 2008, and this specific area will be avoided in future work. If sturgeon are observed in the net, researchers will immediately haul the gear. We anticipate the potential for the following sturgeon interactions annually during our Project A trawl work:

Acipenser brevirostrum: Potential to catch 2 shortnose sturgeon per year.

Acipenser oxyrinchus desotoi: Potential to catch 2 gulf sturgeon per year.

Acipenser oxyrinchus oxyrinchus: Potential to catch 4 Atlantic sturgeon per year.

Given these mitigation measures, area restrictions, and lack of subsequent sturgeon takes in our work, we feel that the requested take numbers reflect an accurate level of unintentional take.

Smalltooth sawfish

The potential for encountering smalltooth sawfish is not expected given their limited range, but the potential does exist. We anticipate that 3 smalltooth sawfish interactions could occur over the life of the permit. In the event of an interaction, proper handling protocols as described in the NOAA Sawfish Handling and Release Guidelines will be followed to minimize injury and stress.

Johnson's Sea Grass and Critical Habitat

No research activities will be conducted over, on or immediately adjacent to Johnson's sea grass or in Johnson's sea grass critical habitat.

Other Sea Grass Species, Live Bottom, or Coral

Research will not be conducted over, on, or immediately adjacent to any non-listed sea grass species, live bottom, or coral habitat.

Non-Research Species

All incidentally captured non-target bycatch species will be returned to the water as soon as possible in an effort to minimize mortality. These trawls have the potential to catch the following species based on research and commercial data:

Based on 3 years of conducting TED testing aboard inshore commercial skimmer trawl vessels in North Carolina, Mississippi, Alabama, and Louisiana we estimate that in addition to sea turtles, commercial skimmer trawls used to conduct research in North Carolina, Florida, Mississippi, Alabama, and Louisiana will capture (over the entire 5 year duration of the permit) ~ 4,000,000 penaeids (shrimp) ~ 1,600,000 sciaenids (drums), ~ 200,000 triglids (sea robins), ~ 400,000 bothids (flounders), ~ 20,000 charcharinids (sharks), ~ 20,000 dasyatids (rays), ~ 20,000 mylobatids (rays), ~1,200,000 clupeids (shad), ~200,000 engraulids (anchovies), ~20,000 synodontids (lizardfish), ~400,000 ariids (catfish), ~20,000 lutjanids (snappers), ~40,000 ehippids (spadefish), ~ 80,000 carangids (jacks), ~ 40,000 sculdids (mantis shrimps), ~ 20,000 portunids (blue crabs), ~ 800,000 ctenophoras (comb jellies), ~ 400,000 pelagiids (sea nettles), and ~ 400,000 ulmarids (moon jellies) during the 5 year period. The shrimp will be retained by the vessel for sale during normal commercial fishing operations (commercial fishing vessels fishing in Federal or state waters) and the rest of the catch will be discarded. Since skimmer trawls are a towed or pushed gear, we expect mortality associated with this gear to be high. However, all efforts will be made to return bycatch to the water as quickly as possible, maximizing the chances for survival.

In addition to skimmer trawls, TEDs will also be tested in the inshore crab trawl fishery in North Carolina. Testing will be conducted aboard contract commercial vessels and we estimate that in addition to sea turtles, commercial crab trawls used to conduct research will capture (over the entire 5 year duration of the permit) ~ 200,000 portunids (blue crabs), ~ 320,000 sciaenids (drums), ~ 40,000 triglids (sea robins), ~ 320,000 bothids (flounders), ~ 4,000 charcharinids (sharks), ~ 4,000 dasyatids (rays), ~ 4,000 mylobatids (rays), ~480,000 clupeids (shad), ~40,000 engraulids (anchovies), ~4,000 synodontids (lizardfish), ~4,000 ehippids (spadefish), ~ 4,000 carangids (jacks), ~ 2,000 sculdids (mantis shrimps), ~ 160,000 ctenophoras (comb jellies), and ~ 80,000 pelagiids (sea nettles), during the 5 year period. The crabs will be retained by the vessel for sale during normal commercial fishing operations (commercial fishing vessels fishing in Federal or state waters) and the rest of the catch will be discarded. Since crab trawls are a towed gear, we expect mortality associated with this gear to be high. However, all efforts will be made to return bycatch to the water as quickly as possible, maximizing the chances for survival.

Finally, traditional shrimp otter trawl TED testing will be conducted in the nearshore coastal waters of the Gulf of Mexico and Atlantic Ocean off the southeastern US coast. Based on 25 years of conducting TED testing aboard inshore commercial shrimp trawl vessels in the southeastern US we estimate that in addition to sea turtles, commercial shrimp trawls used to conduct research will capture (over the entire 5 year duration of the permit) ~ 4,000,000 penaeids (shrimp) ~ 1,600,000 sciaenids (drums), ~ 200,000 triglids (sea robins), ~ 400,000 bothids (flounders), ~ 20,000 charcharinids (sharks), ~ 20,000 dasyatids (rays), ~ 20,000 mylobatids (rays), ~1,200,000 clupeids (shad), ~200,000 engraulids (anchovies), ~20,000 synodontids (lizardfish), ~400,000 ariids (catfish), ~20,000 lutjanids (snappers), ~40,000

ephippids (spadefish), ~ 80,000 carangids (jacks), ~ 40,000 sculdids (mantis shrimps), ~ 20,000 portunids (blue crabs), ~ 800,000 ctenophoras (comb jellies), ~ 400,000 pelagiids (sea nettles), and ~ 400,000 ulmarids (moon jellies) during the 5 year period. The shrimp will be retained by the vessel for sale during normal commercial fishing operations (commercial fishing vessels fishing in Federal or state waters) and the rest of the catch will be discarded. Since shrimp trawls are a towed gear, we expect mortality associated with this gear to be high. However, all efforts will be made to return bycatch to the water as quickly as possible, maximizing the chances for survival.

Resources Needed to Accomplish Objectives: NOAA will fund, support, and oversee these research activities. The Southeast Fisheries Science Center has a well established sea turtle research program. Researchers have a degree in biology or a related field, and they are qualified and trained to conduct this research. The SEFSC Sea Turtle Program uses a standardized training program to ensure that researchers have demonstrated proper sea turtle handling and sampling techniques under SEFSC staff supervision before conducting this research. All designated CIs have undergone this training for handling and sampling sea turtles. Training materials can be found on our website at: <http://www.sefsc.noaa.gov/seaturtlefisheriesobservers.jsp>.

Disposition of Tissues: A tissue and DNA "bank" has been established at the NOAA-NMFS Southwest Science Center's La Jolla Laboratory to archive these biopsy samples for long-term storage in order to provide a repository for samples for these and future conservation research studies. They will be stored until consumed during analysis at the following location: Southwest Fisheries Science Center, La Jolla, CA.

Public Availability of Product/Publications: Research will be reported in a variety of venues, including unpublished reports, Technical Memoranda, and peer-reviewed journals. Each of these publications will be posted promptly on our website at <http://www.sefsc.noaa.gov/seaturtlesprogram.jsp>.

Location/Take Information
Location

Research Area: Atlantic Ocean **States:** AL,DE,FL,GA,LA,MD,MS,NC,NJ,NY,PR,SC,TX,VA,VI
Location Description: Project A: Turtle Excluder Device (TED) Evaluations Atlantic Ocean, Gulf of Mexico, Caribbean Sea and tributaries (animals captured within fisheries managed by Federal authority)

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Turtle, loggerhead sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	150	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority														

2		Turtle, loggerhead sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	70	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority												
3		Turtle, Kemp's ridley sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	80	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority												
4		Turtle, Kemp's ridley sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	25	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority												
5		Turtle, leatherback sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	65	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority												

6		Turtle, leatherback sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	20	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority)														
7		Turtle, green sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	35	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority														
8		Turtle, green sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	15	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority														
9		Turtle, hawksbill sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	20	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority														

10		Turtle, hawksbill sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	10	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority												
11		Turtle, olive ridley sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	20	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority												
12		Turtle, olive ridley sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	10	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority												
13		Turtle, unidentified sea	NA (NMFS Endangered)	Wild	All except hatchling	Male and Female	50	1	Handle/Release	Capture under other authority	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured within fisheries managed by Federal authority												

14		Turtle, unidentified sea	NA (NMFS Endangered)	Wild	All except hatchling	Male and Female	25	1	Capture/Handle/Release	Net, trawl	Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project A Turtle Excluder Device (TED) Evaluations: animals captured by fishermen contracted by researchers to conduct experimental trawling in waters managed by State authority												
15		Turtle, loggerhead sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	3	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												
16		Turtle, Kemp's ridley sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	2	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												
17		Turtle, green sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	2	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												
18		Turtle, leatherback sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	1	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												
19		Turtle, hawksbill sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	1	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												

20		Turtle, olive ridley sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	1	1	Unintentional mortality	Net, trawl	Salvage (carcass, tissue, parts); Unintentional mortality	N/A	5/23/2017	5/31/2022
		Details: Unintentional mortalities caused by forcible submergence/drowning during trawl captures; total requested unintentional mortality is for the 5-year duration of the permit, not annually												

Location

Research Area: Atlantic Ocean **States:** AL,CT,DE,FL,GA,LA,MA,MD,MS,NC,NH,NJ,NY,PA,PR,RI,SC,TX,VA,VI

Location Description: Project B: Modifications to Longline Fisheries Gear. Atlantic Ocean, Gulf of Mexico, Caribbean Sea and tributaries (animals captured within fisheries managed by Federal authority)

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Turtle, loggerhead sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	30	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority												
2		Turtle, Kemp's ridley sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	10	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority												
3		Turtle, leatherback sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	30	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
		Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority												

4		Turtle, green sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	10	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority														
5		Turtle, hawksbill sea	Range-wide (NMFS Endangered)	Wild	All except hatchling	Male and Female	10	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority														
6		Turtle, olive ridley sea	Range-wide (NMFS Threatened)	Wild	All except hatchling	Male and Female	10	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority														
7		Turtle, unidentified sea	NA (NMFS Endangered)	Wild	All except hatchling	Male and Female	10	1	Handle/Release	Capture under other authority	Import/export/receive, parts; Mark, carapace (temporary); Mark, flipper tag; Mark, PIT tag; Measure; Photograph/Video; Sample, skin biopsy; Weigh	N/A	5/23/2017	5/31/2022
Details: Project B Modifications to Longline Fisheries Gear. Animals captured within fisheries managed by Federal authority														

NEPA Checklist

1) If your activities will involve equipment (e.g., scientific instruments) or techniques that are new, untested, or otherwise have unknown or uncertain impacts on the biological or physical environment, please discuss the degree to which they are likely to be adopted by others for similar activities or applied more broadly.

No. None of the activities that we propose conducting (applying PIT, Inconel tags; collecting morphometric data and skin tissue samples) are new, innovative, or experimental. All of these activities have been conducted in the past with little or no detrimental effect to sea turtles. We will be using non-lethal means of obtaining turtles that represent negligible risk to the animals. In addition, we will take all necessary precautions to ensure the health and safety of the turtles during all phases of our activities. Thus, we feel that none of our activities will be

perceived to be controversial by the public.

2) If your activities involve collecting, handling, or transporting potentially infectious agents or pathogens (e.g., biological specimens such as live animals or blood), or using or transporting hazardous substances (e.g., toxic chemicals), provide a description of the protocols you will use to ensure public health and human safety are not adversely affected, such as by spread of zoonotic diseases or contamination of food or water supplies.

Yes, our activities involve the collection, handling and transport of skin tissue biopsy samples. All samples will be collected, handled, stored, and shipped in such a manner as to ensure human safety from injury or zoonotic disease transmission as well as provide for the protection of the sea turtles that are sampled. Researchers will wear disposable gloves, and samples will be stored in saturated NaCl solution, or in rare cases, dimethyl sulfoxide (DMSO), a non-toxic solution contained within sealed vials. All animals will be handled in accordance with defined careful handling protocols designed to minimize injury risk to the researcher. Gloves will be worn and aseptic practices followed when sampling turtles to minimize risks of transmitting any pathogens.

3) Describe the physical characteristics of your project location, including whether you will be working in or near unique geographic areas such as state or National Marine Sanctuaries, Marine Protected Areas, Parks or Wilderness Areas, Wildlife Refuges, Wild and Scenic Rivers, designated Critical Habitat for endangered or threatened species, Essential Fish Habitat, etc. Discuss how your activities could impact the physical environment, such as by direct alteration of substrate during use of bottom trawls, setting nets, anchoring vessels or buoys, erecting blinds or other structures, or ingress and egress of researchers, and measures you will take to minimize these impacts.

see attached file

4) Briefly describe important scientific, cultural, or historic resources (e.g., archeological resources, animals used for subsistence, sites listed in or eligible for listing in the National Register of Historic Places) in your project area and discuss measures you will take to ensure your work does not cause loss or destruction of such resources. If your activity will target marine mammals in Alaska or Washington, discuss measures you will take to ensure your project does not adversely affect the availability (e.g., distribution, abundance) or suitability (e.g., food safety) of these animals for subsistence uses.

These entities will be unaffected by our activities.

5) Discuss whether your project involves activities known or suspected of introducing or spreading invasive species, intentionally or not, (e.g., transporting animals or tissues, discharging ballast water, use of equipment at multiple sites). Describe measures you would take to prevent the possible introduction or spread of non-indigenous or invasive species, including plants, animals, microbes, or other biological agents.

Transport of sea turtles or sealed, preserved skin biopsy tissues would not spread non-indigenous or invasive species.

Project Contacts

Responsible Party: Lisa L Desfosse

Primary Contact: Lesley Stokes

Principal Investigator: Jeff Gearhart

Other Personnel

Name	Role(s)
Daniel G Foster	Co-Investigator
Bret D Hataway	Co-Investigator
John Mitchell	Co-Investigator

Attachments

- Application Archive - (Added Jun 7, 2017)
- Certification of Identity - (Added Mar 22, 2016)
- Contact - Bret D Hataway (Added Sep 6, 2013)
- Contact - Bret D Hataway (Added Jan 26, 2011)
- Contact - Bret D Hataway (Added Mar 21, 2016)
- Contact - Brian Stacy (Added Mar 31, 2014)
- Contact - Daniel G Foster (Added Mar 21, 2016)
- Contact - Daniel G Foster (Added Jan 26, 2011)
- Contact - Jeff Gearhart (Added Jan 26, 2011)
- Contact - Jeff Gearhart (Added Mar 21, 2016)
- Contact - John Mitchell (Added Jan 26, 2011)
- Contact - John Mitchell (Added Mar 21, 2016)
- Contact - Lesley Stokes (Added Jul 27, 2017)
- Project Description - (Added Jan 6, 2017)
- Project Description - (Added Jan 6, 2017)
- Project Description - (Added Jan 6, 2017)
- References - (Added Mar 21, 2016)

Status

Application Status:	Application Complete		
Date Submitted:	March 22, 2016		
Date Completed:	July 29, 2016		
FR Notice of Receipt Published:	August 15, 2016	Number:	2016-19271
Comment Period Closed:	September 15, 2016	Comments Received:	Yes
Last Date Archived:	March 25, 2020	Comments Addressed:	Yes

- ESA Section 10(a)(1)(A) permit (other)
 - Current Status: Issued Status Date: May 23, 2017
 - Section 7 Consultation: Formal Consultation
 - NEPA Analysis: Categorical Exclusion
 - Date Cleared by General Counsel: May 22, 2017
 - FR Notice of Issuance/Denial Published: June 27, 2017 Notice Number: 2017-13434
 - Expire Date: May 31, 2022

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Modification Requests

This section is currently empty.

Reports

Reports Required						
Nbr	Report Type	Report Period		Date Due	Status	Date Received
		Start Date	End Date			
1	Annual	05/23/2017	05/31/2018	08/31/2018	Submitted	09/11/2018
2	Annual	06/01/2018	05/31/2019	08/31/2019	Submitted	10/02/2019
3	Annual	06/01/2019	05/31/2020	08/31/2020	N/A	
4	Annual	06/01/2020	05/31/2021	08/31/2021	N/A	
5	Combined Annual/Final	06/01/2021	05/31/2022	11/30/2022	N/A	